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Abstract

Two experiments were conducted to examine the effects of a synthetic progestogen (altrenogest) on growth and carcass characteristics of boars. Altrenogest inhibited both the growth of the testes and the pubertal rise in testosterone that is associated with maleness. Growth rate, feed intake, and feed/gain were unaffected by feeding altrenogest in both experiments; however, in Exp. 2. growth rate and feed intake during the 4-wk withdrawal of altrenogest were less than those in the control boar or barrow groups. These changes appeared to be related to marked mounting activity of boars beginning 5 days after withdrawal of altrenogest from the feed. Feeding altrenogest to growing boars had no negative effects on carcass qualitative traits, but intensity of boar odor in fat was not diminished in treated boars. It is possible that altrenogest would have to be fed until about 1 wk before slaughter or later to allow marketing of boars without significant boar odor.; Swine Day, Manhattan, KS, November 20, 1986

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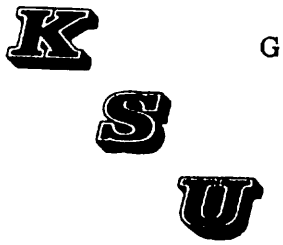

GROWTH, CARCASS AND BOAR-ODOR TRAITS IN MALE PIGS FED ALTRENOGEST[1]

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Summary

Two experiments were conducted to examine the effects of a synthetic progestogen (altrenogest) on growth and carcass characteristics of boars. Altrenogest inhibited both the growth of the testes and the pubertal rise in testosterone that is associated with maleness. Growth rate, feed intake, and feed/gain were unaffected by feeding altrenogest in both experiments; however, in Exp. 2, growth rate and feed intake during the 4-wk withdrawal of altrenogest were less than those in the control boar or barrow groups. These changes appeared to be related to marked mounting activity of boars beginning 5 days after withdrawal of altrenogest from the feed. Feeding altrenogest to growing boars had no negative effects on carcass qualitative traits, but intensity of boar odor in fat was not diminished in treated boars. It is possible that altrenogest would have to be fed until about 1 wk before slaughter or later to allow marketing of boars without significant boar odor.

Introduction

Feeding boars rather than barrows produces carcasses with enhanced muscling and leanness, and increases efficiency of producing lean muscle. However, feeding boars for production of meat has been limited in most areas of the world because of: 1) possible mating of boars with developing replacement gilts fed in the same pen, 2) objectionable boar odor or boar taint in the fat and meat, 3) male aggressiveness during the finishing phase, and 4) traditional unacceptance of finished boars by consumers and meat packers. Several of these factors are related to an increase of serum testosterone, a steroidal hormone produced by the developing and mature testes, that occurs during pubertal development (105 to 120 days of age) in the boar. Therefore, if secretion of testosterone could be suppressed for about 1 to 2 mo, boars could reach market weights before the onset of the undesirable male characteristics described above.

Altrenogest, a synthetic progestogen being tested as a product for synchronization of estrus in gilts and sows, has the ability to inhibit hypothalamic and pituitary regulation of testicular growth and secretion of testosterone, similar

[1]We gratefully acknowledge the donation of altrenogest (Regu-mate®) by Roussel-UCLAF, Paris, France. Altrenogest is an experimental hormone and is not available to swine producers at this time.

[2]Central Soya Feed Research, Decatur, IN 46733

to the action of the native hormone, progesterone, in females. Therefore, when fed to boars, altrenogest might produce a castration-like effect by inhibiting secretion of testosterone. Our objectives were to determine growth rates, feed efficiency, carcass characteristics and boar odor in boars fed altrenogest during the finishing phase (95 to 175 days of age).

Procedures

Exp. 1. Littermate, crossbred boars (n=24) born in March 1984 were moved into a modified open-front facility at 12 wk of age. Boars of similar body weights were assigned randomly to four treatment groups (six boars/group): 1) controls, 2) altrenogest fed for 3 wk (15 to 17 wk of age), 3) altrenogest fed for 6 wk (15 to 21 wk of age), and 4) altrenogest fed for 9 wk (15 to 24 wk of age). Boars were fed a medicated, 18% crude protein (.95% lysine) milo-soybean diet fortified with vitamins and minerals. Altrenogest was provided daily (20 mg) for treated boars mixed in 1 lb feed per boar. The altrenogest-supplemented feed (1 lb) was fed first followed by ad libitum access to feed. The feeders were removed for 8 hr before altrenogest was fed. Three boars were housed in each pen with two pens comprising a treatment group.

Boars and feeders were weighed every 2 wk to allow calculations for growth rate (average daily gain), daily feed intake, and feed/gain (lb of feed intake per lb of gain). Backfat was determined ultrasonically prior to castration at 24 wk of age.

Exp. 2. Utilizing the results from Exp. 1, we designed a second experiment to evaluate further the effect of altrenogest in boars. Littermate, crossbred boars born in March 1985 were handled and fed similarly to those described above. Treatments consisted of: 1) control boars (n=18), 2) boars fed altrenogest (n=18) for 6 wk (15 to 21 wk of age), and 3) barrows (n=18). Altrenogest was mixed into the feed to allow consumption of 20 mg altrenogest/day based on the feed intake of each pen of boars during the previous week.

Growth rate, feed intake and feed/gain were determined during a 6-wk treatment period (15 to 21 wk of age) and during a 4-wk withdrawal of altrenogest (21 to 25 wk of age). Carcass characteristics were determined 24 hr after slaughter. A panel of six people (sensitive to boar odor) were trained to detect various intensities of boar odor in heated fat samples. The intensity of boar odor was evaluated in duplicate fat samples from each pig using a scale of 1 to 5 (1 = no boar odor, 2 = slight, 3 = moderate, 4 = strong, 5 = very strong).

Results and Discussion

Results of Exp. 1 are summarized in Table 1. In general, altrenogest had little effect on daily gains, feed intake, or feed efficiency. Boars fed altrenogest for 6 and 9 wk tended to consume more feed and those fed altrenogest for 6 wk were less feed efficient ($P<.05$) than control boars. Testicular growth was reduced markedly as the duration of feeding increased. For each additional week of feeding altrenogest, the weight of the testes decreased by .07 lb or about 1 ounce per week. It appeared from Exp. 1 that 6 wk of feeding altrenogest was sufficient to

inhibit testicular growth and secretion of testosterone to less than 1 ng/ml (data not shown).

Table 1. Growth, Backfat and Testicular Weights of Boars Fed Altrenogest (Exp. 1).

Item	Weeks of Feeding Altrenogest				
	Control	3	6	9	SE
No. boars	6	6	6	6	
Initial wt, lb	95.0	95.4	98.1	99.6	4.0
Final wt, lb	200.4	206.1	198.2	212.7	8.6
Avg backfat, in	0.7	0.8	0.7	0.8	0.03
Avg daily intake, lb	5.1	5.1	5.5	5.9	0.4
Avg daily gain, lb	1.8	1.8	1.7	1.9	0.1
Feed/gain	3.0	2.8	3.3[a]	3.2	0.06
Testicular wt[b], lb	1.1	0.8	0.6	0.5	0.06

[a]Different from control ($P<.05$).

[b]Linear decrease ($P<.001$).

In Exp. 2, we repeated the 6-wk treatment group in addition to groups of untreated (control) boars and barrows of similar age. Growth performance for Exp. 2 is summarized in Table 2. The barrows were slightly heavier before the treatment period began; however, the barrows and control boars were heavier at the end of the 6-wk treatment and 4-wk withdrawal periods. Control boars consumed less feed than the altrenogest-fed boars and barrows, whereas the barrows gained less weight during treatment. Control boars were most efficient with feed/gain averaging 26% better during the treatment period. Upon withdrawal of altrenogest, the altrenogest-fed boars ate less feed, gained less weight, and were less efficient than the remaining pigs. Marked mounting and riding activity of these boars began 5 days after the last feeding of altrenogest and it appeared that this activity resulted in disrupted feeding behavior and, therefore, reduced growth performance.

Table 2. Growth Performance (Exp. 2).

Item	Age, wk	Control Boars	Altrenogest Boars	Barrows	SE
No. pigs		18	18	18	
Initial wt, lb	15	111.1	112.9	117.7	2.0
Final wt, lb	25	250.4[a]	231.3[b]	250.4[a]	3.1
Altrenogest treatment	15-21				
Avg feed intake, lb		6.0[a]	7.7[b]	7.2[b]	0.3
Avg daily gain, lb		2.0[ab]	2.2[a]	1.9[b]	0.04
Feed/gain		2.9[a]	3.6[b]	3.7[b]	0.3
Altrenogest withdrawal	21-25				
Avg feed intake, lb		6.6[a]	4.3[b]	7.4[c]	0.2
Avg daily gain, lb		1.9[a]	1.0[b]	1.8[a]	0.07
Feed/gain		3.5[a]	4.6[b]	4.1[c]	0.4

[a,b,c]Means with different letters differ (P<.05)

Carcass traits of boars were only slightly altered by treatment with altrenogest (Table 3). Both slaughter and hot carcass weights were lighter than those of control boars and barrows, consistent with their lighter body weights at the end of the withdrawal period. Dressing percentage was unaffected but the length of the carcass was shorter for barrows and altrenogest-fed boars than for control boars. Both groups of boars had more muscle and less fat thickness but higher boar-odor scores than those of the barrows. In general, the boar carcasses were superior to those of the barrows except that all boar carcasses had a slight to moderately objectionable boar odor.

We observed no effect of altrenogest on growth performance in Exp. 1 but a marked detrimental effect on growth and feed efficiency after withdrawal of altrenogest in Exp. 2. We are unable to explain these differences because the pigs were of similar breeding, were born in March of consecutive years, and were raised in the same facility. The environmental temperatures were quite similar in both years; however, it tended to be warmer in 1984. Based on these results, it would appear that altrenogest should be fed until about 1 wk before slaughter to prevent the reduced growth performance. We believe that this approach also would eliminate any boar-odor problems in boars because testicular growth and secretion of testosterone were reduced markedly, both of which are necessary to sustain the 5 α -androstenone products (metabolites of testosterone) that produce the objectionable odor in carcasses (fat) of boars.

Table 3. Carcass Measurements and Boar Odor (Exp. 2).

Item	Control Boars	Altrenogest Boars	Barrows	SE
No. pigs	12	12	12	
Slaughter wt, lb	259.7[a]	242.7[b]	253.7[a]	4.0
Hot carcass wt, lb	189.4[a]	178.1[b]	189.4[a]	3.7
Dressing percentage	73.0[a]	73.4[b]	74.5[b]	0.7
Carcass length, in	33.8[a]	33.2[ab]	32.8[b]	0.2
Loineye area[1], sq. in	5.7[a]	5.2[a]	4.9[b]	0.2
Percentage muscle	56.1[a]	54.8[a]	51.7[b]	0.9
Fat thickness[2], in	0.9[a]	1.0[a]	1.2[b]	0.04
USDA grade[3]	1.3	1.6	2.2	0.2
Color[1,4]	2.7	2.7	2.5	0.2
Firmness[1,4]	2.7	2.5	2.5	0.1
Exudativeness[1,4]	2.8[a]	2.7[a]	2.6[b]	0.1
Boar-odor scores[5]	2.7[a]	2.5[a]	1.8[b]	0.3

[1]Measured at the 10th rib.
[2]Measured at the last rib.
[3]Lower numbers indicate higher grade.
[4]Based on a 1 to 5 scale with 3 being ideal.
[5]Boar odor: 2 = slight and 3 = moderate intensity.
[a,b]Means with different letters differ (P<.05).